Research summary

On-site testing of avian influenza in the poultry industry

About the study

Time is the most critical element when it comes to managing avian influenza outbreaks. While surveillance is key in minimizing outbreaks, no tests currently exist that allow for quick, on-site testing. In an attempt to create a simple, cost-effective system for testing, scientists at the University of Guelph's BioNano Laboratory developed a colorimetric system enabled by nanotechnology that can quickly detect disease-related pathogens through the naked eye. The colorimetric system produces visible colour changes in samples where the virus exists.

Methods

Two separate strains of the virus were inserted into 10 and 11 day old eggs. Researchers diluted a third strain of the virus to act as a control group for their experiment. After testing the different mixtures using the colorimetric system, researchers performed comparison studies using traditional commercial testing kits (ELISA) which already exist within the market. Additionally, real viral cultures obtained from the Ontario Veterinary College were also used in the testing.

Findings

The researchers found that the colorimetric technique of detection developed in this study showed improvements in colour quality and sensitivity in those instances where the virus was present. In fact, comparisons with commercial avian influenza diagnostic kits showed that the method proposed in this study was significantly more sensitive in naked eye color detection, providing a quicker turnaround through rapid response than the commercial kit. Specifically, the colormetric system in this study was 811 times more sensitive than the traditional method of detection.

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Conclusions

The ongoing threat of avian influenza and its devastating impact on commercial poultry operations continues to challenge our industry. To help manage outbreaks, the need for early detection is of paramount importance. Rapid testing that can take place on location promises a brighter future for virus detection in the egg industry.

About the researchers

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Citation

Ahmed, S.R., Corredor, J.C., Nagy, É. and Neethirajan, S., 2017. *Amplified visual immunosensor integrated with nanozyme for ultrasensitive detection of avian influenza virus*. Nanotheranostics, 1(3), p.338.

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